

## THE ROENTGEN-RAY DIAGNOSIS OF TUBERCULOUS CERVICAL LYMPH GLANDS.\*

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IN the course of a study of tuberculosis of the cervical glands the roentgen-ray method of diagnosis has served to differentiate it in some cases from Hodgkin's disease, lymphosarcoma, chronic lymphadenitis, carcinoma and cysts. The method has proved so useful as to appear to warrant a presentation of the findings.

From reading and observation one gains the impression that calcification in tuberculous glands of the neck has failed to attract its full share of attention. (1) It is said or implied by good authorities to be rare. (2) Its usefulness in diagnosis by the roentgen ray deserves emphasis.

In discussing tuberculosis of the superficial or external lymph glands, Holt, in *The Diseases of Infancy and Childhood*, states that "Calcification of the glands in this location is rare." A *Text-book of Pathology*, by MacCallum, in referring to tuberculosis of the lymph glands, fails to mention calcification in connection with the cervical glands, yet mentions it as occurring in tuberculous glands generally. From his text on the various groups one might readily conclude that calcification in the cervical lymph glands was not frequent. Adami and Nicholls in 1911, in *Principles of Pathology*, in discussing tuberculosis of the lymph glands, say, "In long-standing cases the glands . . . may contain calcareous spicules." Several recognized pathologists have recently told the writer that they had rarely seen it; and one said he had never seen it.

To contest these views on the rarity of calcification in tuberculous cervical glands the following evidence is presented:

Incident to a three and a half years' study of this disease, during which time some 200 cases have come under close observation and treatment, roentgen-ray plates of the neck of 40 unselected patients were made; 21, or 52.5 per cent of the forty plates, showed definite areas of increased density corresponding in location to the lesions found on physical examination. These areas of density are distinctly more marked than are the shadows of the soft parts. Indeed, they are almost of the density of bone (Fig. 1). They correspond in location to the enlarged glands, sinuses or cold abscesses. They vary in size from a birdshot to an almond; they may be single or multiple; and in two plates the appearance is that of a large area of fine sand (Fig. 2).

\* Read before the Surgical Section of the New York Academy of Medicine, March 4, 1921.



FIG. 1.—A marked example of calcified lymph glands.

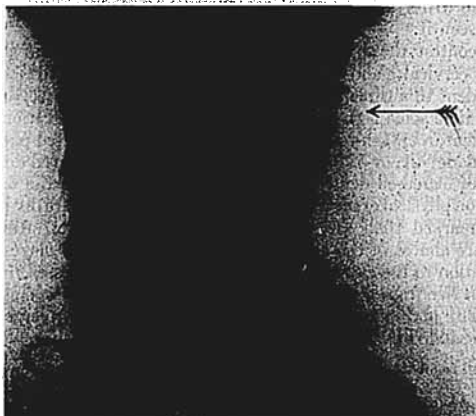


FIG. 2.

Of the 21 patients with positive plates, 10 were proved tuberculous by microscopic examination of tissue excised from the neck. All of the remaining 11 cases were clinically typical of tuberculous glands. Four of these showed such marked, large, discrete areas of density in the plates as to leave little argument about this diagnosis (Figs. 1 and 3). Three were clinically diagnosed in the Presbyterian Hospital tuberculosis clinic as pulmonary tuberculosis (which fact is strong presumptive evidence in favor of the glands being tuberculous). The remaining 4 presented cold abscesses from which typical caseous material was removed and which persisted subsequently as sinuses.

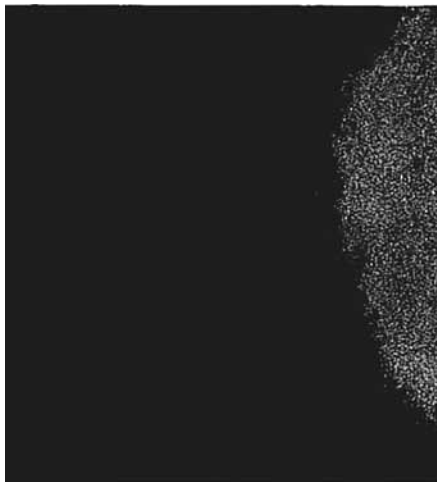


FIG. 3.—This patient had previously had in another hospital by a good surgeon, bilateral "radical" operations, the only patient showing bilateral shadows.

Of the 19 patients who showed no areas of increased density in plates of the neck, 14 were proven tuberculous by microscopic examination or by guinea-pig inoculation. Of the 5 others, 2 had definite pulmonary tuberculosis; 1 presented a cold abscess, caseous material and subsequent persistent sinus; 1 had had proved tuberculous peritonitis; and 1, though not furnishing other evidence, was a typical case clinically. It is the conviction of the writer that all of the 40 patients had tuberculosis of the cervical glands. The age of the patients ranged from five to forty-five years. By chance no younger children were included in the series.

The natural deduction is that the areas of increased density are due to lime salts—to calcification.<sup>1</sup> They have been so reported by the roentgenographic department of the Presbyterian Hospital. Calcification goes with necrosis, and is well known to be common in tuberculosis of the lung and of the mediastinal lymph glands.<sup>2</sup> Tuberculosis of the cervical glands is notorious for its necrosis. What other pathology than calcification incident to tuberculosis could throw these shadows?

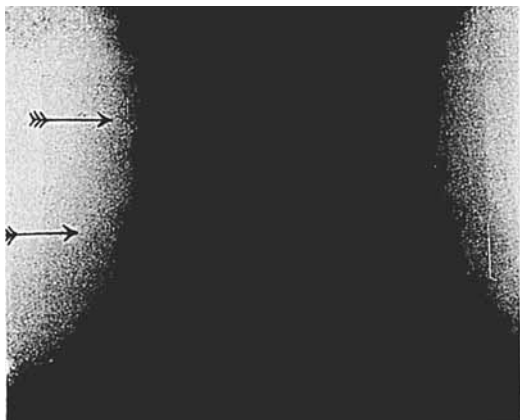


Fig. 4.—The lower arrow points to a small shadow corresponding exactly with the site of a small cold abscess. This girl was referred with the probable diagnosis of a branchial cyst.

In this study only a few plates were obtained of non-tuberculous lesions. None showed evidence of calcification. There was one remarkable case of Hodgkin's disease with extensive necrosis and ulceration in the neck of many months' duration which at autopsy showed no evidence of calcification.

In a study of the literature and in a wide personal canvass, simple lymphadenitis, Hodgkin's disease, lymphosarcoma, carcinoma, syphilis, cysts and fistulae of the neck and other lesions that might be confused with tuberculosis here have not been shown to present calcification nor other changes revealing such increased density by the roentgen ray.<sup>3</sup> It is only fair to state certain exceptions acquired by the writer to this statement. MacCallum

<sup>1</sup> Opie, E. L.: The Focal Pulmonary Tuberculosis of Children and Adults, *Jour. Exper. Med.*, June, 1917, 25, 855.

<sup>2</sup> *Ibid.*

<sup>3</sup> Substantiated by personal communication from Drs. Jobling, Longcope, Symmers Clarke and others.

describes calcification in adenomatous goiter and Le Wald cites instances of thyroid glands showing calcification by the roentgen ray. This would not readily be confused with disease of the lymph glands. In "Notes on Tumors," Wood says, "The contents . . . (of a dermoid cyst) . . . may undergo calcification." These are found, he says, "In the parotid region" and "in the deeper tissues of the lateral aspects of the neck." We know, however, that these locations are rare for dermoids, and we may infer that, even so, they do not frequently calcify. Dr. E. W. Peterson reported to the writer a personal case wherein the pathologist reported calcification in queer malignant tissue from a cervical lymph gland. Calcification of an artery in the neck might throw a confusing shadow, but most of our difficulty of diagnosis in cervical lymph-gland disease we meet in subjects too young for arteriosclerosis.

Four explanations are offered by the writer for the supposed rarity: (1) The lime salts are often thinly distributed in the periphery of the necrotic mass when seen microscopically as a blue layer but not noticeable on gross examination.<sup>4</sup> (2) In 2 of the writer's cases before operation the roentgen ray showed very definite shadows (Fig. 2) while at operation the site of the shadows was occupied by a large cold abscess with a thickened capsule. It is thought that the lime sand was suspended in the pus, like a fine emulsion, and therefore undetected. (3) The pathologists customarily and justifiably examine only one or two of a mass of excised tuberculous glands without searching through the whole. (4) The cervical glands are rarely examined at autopsy.

The 21 positive plates indicate that tuberculous disease of the cervical lymph glands may, beyond all reasonable doubt, give evidence of calcification, and, conversely, that the evidence of calcification, studied in conjunction with the clinical findings, spells tuberculosis.

The practical application of this relatively frequent occurrence at once becomes apparent, and indeed is recognized by individual workers here and there.<sup>5 6</sup> Whatever the percentage of incidence, evidence of calcification is sufficiently frequent in patients with tuberculous lesions in the neck to warrant everyday use of the roentgen ray in diagnosis. It will often save a patient a biopsy which scars the neck, causes discomfort and necessitates some loss of working time.

One plate is so inexpensive as to make it worth a trial even though there is a good chance of its being negative. A small plate that fits between the occiput and the second dorsal vertebra, and snugly against the back of the neck, is more likely to pick up the smaller

<sup>4</sup> Symmers: Personal communication.

<sup>5</sup> Haynes, R. S.: The Differential Diagnosis of Enlargements of the Cervical Lymph Nodes, *Arch. Pediat.*, New York, 1918, 35, 226.

<sup>6</sup> Editorial: Standards of Diagnosis and Treatment of Tuberculous Cervical Adenitis, *Am. Rev. Tuberc.*, Baltimore, 1918-19, 2, 564.

shadows than a larger plate. One anteroposterior view is usually sufficient. The lateral views are rarely helpful, unless there be lesions in the median line, because the glands are largely obscured by vertebræ, mandible, hyoid bone and thyroid cartilage. Except in children the usual chest plate is not long enough to ensure a good view of the chest and the neck.

| Evidence of tuberculosis of glands.   | 21 patients showing shadows in plates. | Age. | Sex. | Number of chart. |
|---|--|------|------|------------------|
| Clinical and roentgen-ray plate   | C. S.                                  | 30   | F.   | 88307            |
|   | G. T.                                  | 12   | F.   | 77277            |
|   | N. C.                                  | 45   | F.   | 97803            |
|   | M. M.                                  | 48   | F.   | 97958            |
| Clinical and tuberculosis of the lungs . . . . .  | L. S.                                  | 30   | M.   | 74349            |
|   | J. L.                                  | 11   | F.   | 96321            |
|   | J. M.                                  | 26   | M.   | 6947             |
| Clinical, persistent sinus, necrotic material and the old history of excised tuberculous gland . . .                            | T. G.                                  | 10   | F.   | 71175            |
|   |  |      |      |                  |
| Clinical and persistent sinus . . .   | K. O'R.                                | 16   | F.   | 92284            |
|   | M. S.                                  | 6    | F.   | P. P.            |
|   | C. S.                                  | 27   | M.   | 1551             |
| Microscopic examination of the tissue excised from the lesion .   | E. U.                                  | 19   | F.   | 43274            |
|   | M. B.                                  | 27   | M.   | 46555            |
|   | S. P.                                  | 30   | F.   | 43444            |
|   | E. S.                                  | 22   | F.   | 45341            |
|   | G. P.                                  | 15   | F.   | 48616            |
|   | S. T.                                  | 10   | F.   | 45771            |
|   | H. H.                                  | 20   | M.   | 2223             |
|   | C. B.                                  | 15   | F.   | 1710             |
|   | J. M.                                  | 20   | F.   | 1737             |
|   | H. C.                                  | 21   | M.   | P. P.            |
| 19 patients showing no shadows.   |  |      |      |                  |
| Clinical and proved tuberculosis of the peritoneum . . . . .  | J. McK.                                | 10   | F.   | 97662            |
| Clinical and tuberculosis of the lungs . . . . .  | A. L.                                  | 5    | F.   | 42608            |
|   | K. L.                                  | 26   | F.   | 97804            |
| Clinical . . . . .  | P. M.                                  | 28   | M.   | 96052            |
| Clinical and persistent sinus . . .   | S. G.                                  | 23   | F.   | 73387            |
| Microscopic examination of the tissue excised from the lesion or positive guinea-pig test of material from the lesion . . . . . | M. K.                                  | 24   | F.   | 92680            |
|   | F. K.                                  | 24   | M.   | 89999            |
|   | M. H.                                  | 8    | F.   | 44262            |
|   | A. N.                                  | 42   | F.   | 35192            |
|   | H. Y.                                  | 22   | M.   | 37842            |
|   | W. F.                                  | 23   | M.   | 43265            |
|   | T. G.                                  | 28   | M.   | 39434            |
|   | M. Z.                                  | 17   | F.   | 22461            |
|   | M. F.                                  | 8    | F.   | 93009            |
|   | M. R.                                  | 14   | F.   | P. P.            |
|   | S. D.                                  | 29   | M.   | 2090             |
|   | C. W.                                  | 28   | F.   | 34232            |
|   | F. S.                                  | 19   | F.   | 1600             |
|   | J. A.                                  | 17   | M.   | 49619            |

It is important to make a positive diagnosis of diseased cervical lymph glands. The treatment varies with the disease. Some cases of Hodgkin's disease and some of tuberculosis profit by therapeutic operative removal; but with a similar clinical picture in each the operation might not be the same. Likewise, and perhaps more important, if roentgen therapy be employed the dosage which, for example, may help to heal tuberculosis may indeed accelerate the advance of carcinoma, lymphosarcoma and Hodgkin's disease.

**Conclusions.** 1. Calcification in tuberculous cervical lymph glands is not rare. Although the series here presented is small, the indication is that calcification occurs in 52.5 per cent of such patients over five years of age.

2. A positive diagnosis of tuberculous cervical glands, abscesses and sinuses may be made so frequently by a small plate, studied with the clinical picture, as to render the roentgen ray worth a trial before subjecting the patient to a biopsy.

The writer acknowledges, with grateful appreciation, the assistance given to this study by the College of Physicians and Surgeons, Columbia University, through the Bull and the Harriman fellowship funds.

### THREE CASES OF LEUKEMIA IN ONE FAMILY.\*

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THESE cases are reported not because they present unusual clinical features as leukemia, but because of the interesting facts that three members of one family were affected, and of the most unusual combination, there being one of the myelogenous and two of the lymphatic type.

While there are those who hold that leukemia is of bacterial origin and others that it follows infectious processes of long duration, *i. e.*, tuberculosis, syphilis and malaria, and still others that it is due to a new growth of the blood-forming tissues, yet the fact remains that the etiology of leukemia is unknown. We have no evidence that would prove that heredity is a factor in this disease, although some authors have advanced such a theory. Nor has evidence been produced that would cause one to believe that it is transmitted from man to man.

\* Reported to the Columbus Academy of Medicine, November 14, 1921.